World's First Brain-Like Super-Computer

A supercomputer which is designed to work in the same way as the human brain was switched on for the first time.

- The supercomputer is named as **Spiking Neural Network Architecture (SpiNNaker) machine.**
- It has million-processor-core and is capable of completing more than 200 million actions per second, with each of its chips having 100 million transistors.
- The SpiNNaker machine is **designed and built in The University of Manchester, UK.**
- This supercomputer was conceptualized almost 20 years ago and its construction begin in 2006.

How It Works?

- Biological neurons are basic brain cells present in the nervous system that communicate by emitting 'spikes' of electrochemical energy.
- Neuromorphic computing (electronic circuits mimicking neural-biological architecture) uses large-scale computer systems containing electronic circuits to mimic these spikes in a machine.
- SpiNNaker is unique because it does not communicate by sending large amounts of information from point A to B via a standard network like in traditional computer but it mimics the parallel communication architecture of the brain, sending billions of small amounts of information simultaneously to thousands of different destinations.

Applications

- The SpiNNaker machine will be capable of simulating a billion simple neurons, or millions of neurons with complex structure and internal dynamics.
- The supercomputer will help neuroscientists better understand how the human brain works. It does this by running extremely large scale real-time simulations which simply aren't possible on other machines.
- SpiNNaker has been used to simulate a region of the brain called the Basal Ganglia – an area affected in Parkinson's disease, thus it has massive potential for neurological breakthroughs in science such as pharmaceutical testing.
- The SpiNNaker has been harnessed to control a robot, the SpOmnibot. This robot uses the SpiNNaker system to interpret real-time visual information and navigate itself towards certain objects while ignoring others.

Human Brain Project

- Human Brain Project is an effort to construct a virtual human brain.
- The Human Brain Project (HBP) is building a research infrastructure to help advance neuroscience, medicine, and computing.
- It was started in October 2013 and is funded by the European Union.

Biologically-Inspired Massively Parallel Computation (BIMPC):

- It was a five-year project, which began in March 2013, funded by the European Union.
- Its main goal is to use the neuromorphic platform to build models of brain subsystems and of nonneural applications of the brain-inspired architecture.